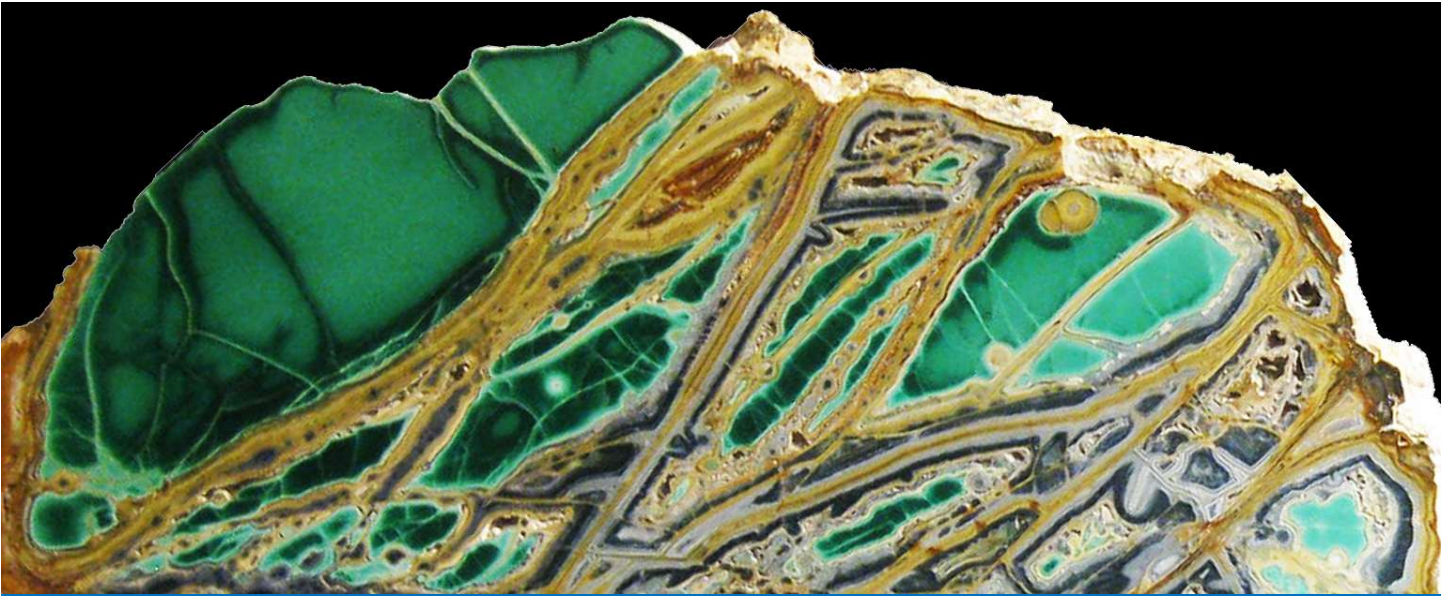
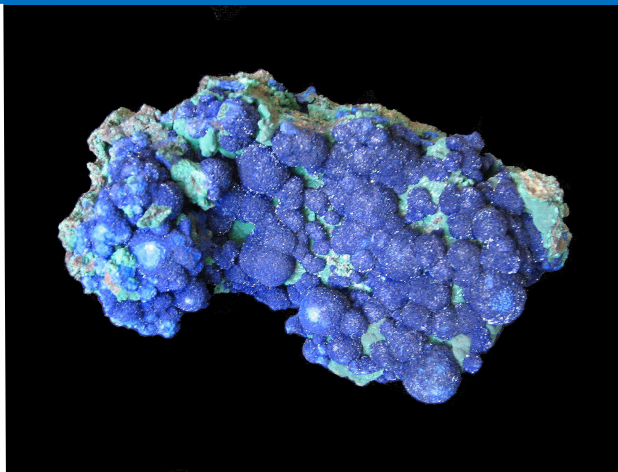


Gillespie

MUSEUM



LESSON PLAN—MYSTERY MINERAL LAB



MYSTERY MINERAL LAB

Lesson Description

In this laboratory activity, students will investigate the properties of some common minerals. Characteristics that aid in the identification of minerals will be discussed in grade-appropriate terms (*hardness, color, luster, cleavage, and streak* for upper elementary and older). This is an excellent activity to help students develop observation skills.

Learning Objectives

- Define a mineral as well as several properties pertaining to the characteristics of minerals (hardness, color, luster, cleavage, and streak)
- Make close observations of unknown mineral specimens
- Record data and use an identification key

Standards

FLNGSS SC.2.E.6.1—Recognize that Earth is made up of rocks. Rocks come in many sizes and shapes.

FLNGSS SC.4.E.6.2—Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks.

Materials Needed

- Gillespie Museum specimen kit (the minerals have the **yellow** labels)
- Mystery Mineral Lab video and Mystery Mineral Lab Review video (found on the Gillespie Museum's website under Educational Resources > Geology & Minerals)
- Pencils
- Lab data sheets (provided below)

How To

- First, play the Mystery Mineral Lab video which will introduce students to minerals and how to study their properties.
- After the video, divide into groups and complete the lab activity.
- Upon completion of the lab, go over the Mystery Mineral Answers & Fun Facts (found at the end of these lesson plans) to learn more about the specimens they were studying.
- Tips: 1. Please do not allow students to peel the numbered labels off of the rocks! 2. Instruct the students to use medium pressure when testing the minerals for streak and hardness. They must be gentle with the minerals and refrain from making streaks all over the streak plates so that other students can continue to use the materials in the future.

Key to Specimens

The rocks are numbered with yellow labels. Note: the numbers are not in order.

#1—Fluorite
#3—Hematite
#4—Pyrite
#5—Milky quartz
#6—Calcite
#7—Muscovite
#8—Magnetite
#10—Talc
#12—Biotite
#13—Graphite
#15—Selenite

Mystery Mineral Lab

Instructions for completing the lab are found in the video. The activity is designed to use ONLY the minerals with the yellow numbers. If you try to use the rocks with the blue numbers, it will not work because rocks are mixtures of minerals. You can choose to use the Mineral ID key or not—the main purpose of this lab is to investigate the properties of the specimens, not identify them, but students always want to know what they are looking at! If you have younger students, you can elect to use the simpler lab sheet emphasizing observation skills and allow them ample time to interact with the specimens in the kit. Rarely is there enough time for students to complete the data sheet for ALL the minerals in the kit. You may want to limit the number of specimens tested due to time.

Materials

Lab sheet (beginner or advanced level)
Mineral specimens
Hand lens or magnifying glass
Glass hardness plates

Pencil
Magnet (not included in kit)
Streak plates (white and black)
Mineral ID key

Extension

- Social studies—Have students research ways that minerals are used in our everyday lives and make short presentations to the class about what they learned.
- Art & Math—On the Gillespie Museum educational resources page, you can find crystal origami sheets. You can print those out, students can color them in, and then follow the instructions for cutting and folding into the crystal shape. Then study the number of sides and measurements of the angles of your shapes.
- Science—Grow your own crystals in the classroom!

Crystals are solids that form when their atoms are arranged into orderly, repeating structures. Using some kitchen chemistry you can create the right environment to grow your own crystals for a sweet treat or a sparkly decoration.

Materials

Jar or open-mouthed container

Twine

Pot or kettle for boiling water

Food coloring (optional)

Skewer/dowel – long enough to rest on the top of the jar

Pipe cleaner

Borax or sugar

Method

1. Take the pipe cleaners and make a shape.
2. Tie a length of twine to your skewer/dowel and to the top of your pipe cleaner shape.
3. Boil enough water to nearly fill the container you are using to grow your crystal and carefully pour the water into the jar. To color your crystals, mix in food coloring at this step.
4. Stir in 1-2 tablespoons of Borax or sugar (the solute) at a time until it dissolves, continuing until no more dissolves and you see some of the solute that remains. Wear gloves if using Borax, mix the solution in a container that won't be used for food or drink, and do not lean over the container while stirring.
5. Lower the pipe cleaner shape into the container (making sure nothing touches the sides). Cover the opening and place in a safe location. Let the solution sit: Borax crystals can be ready after a few hours or overnight; sugar crystals might need to remain suspended for a few days.
6. Once the crystals reach your desired size, gently remove them from the solution and lay out to dry.

MYSTERY MINERAL LAB

Instructions

Name _____

Choose one of the minerals (with the yellow numbers). Look at it carefully! Record your observations in the boxes below. Once you are finished, use the key to identify your mineral and write down its name.

Draw your mineral	Circle words that describe your mineral Shiny Hard Smooth Rough Solid See-through Flaky Dull Metallic Earthy Soft Patterned
What is one thing you notice about your mineral?	What is your mineral? Once you have completed your observations, use the key to write down the name of it here. _____

MYSTERY MINERAL LAB

Name _____

Sample unknown minerals to determine their properties. Once you have tested your minerals, use the key to identify them. You may add lines on the back if you need more space.

[illegible]

MYSTERY MINERAL LAB—ID KEY

Color	Clarity	Luster	Streak	Hardness	Observations	Mineral name
Purple, green, yellow, or clear	Transparent	Glassy	White	Soft	Glow under UV light	Fluorite
Silvery-grey or reddish brown	Opaque	Metallic or dull when tarnished	Reddish brown	Hard	Heavy for its size	Hematite
Brassy or yellow	Opaque	Metallic or dull when tarnished	Brown to greenish-black	Hard	May look like gold	Pyrite
White	Translucent	Glassy or waxy	White	Hard	Milky color	Milky quartz
Clear, white, yellow, green, orange	Transparent or translucent	Glassy or waxy	White	Soft	Rhombus cleavage	Calcite
Colorless, silver, dark brown	Transparent to opaque if thick	Pearly	White	Soft	Splits into thin, flexible sheets (layers are visible from side)	Muscovite

MYSTERY MINERAL LAB—ID KEY

Color	Clarity	Luster	Streak	Hardness	Observations	Mineral name
Black	Opaque	Metallic to dull	Black	Hard	Strongly magnetic	Magnetite
White, grey, or greenish	Translucent	Waxy or pearly	White	Soft	Feels soapy or greasy	Talc
Black or dark brown	Translucent	Pearly	White to grey	Soft	Splits into thin, flexible dark sheets	Biotite
Dark grey to black	Opaque	Metallic	Black	Soft	Writes on paper easily, feels greasy	Graphite
Colorless or white	Transparent	Pearly or glassy	White	Soft	Can be scratched with a fingernail	Selenite

MYSTERY MINERAL ANSWERS & FUN FACTS

Fluorite (1) is used in toothpaste to help keep your teeth healthy and free of cavities! Fluorite glows under ultraviolet (UV) light. Its crystal shape is very distinctive – its form is either a cube or an octahedron, which is basically looks like two pyramids stuck together by their bases.

Hematite (3) is the most important ore of iron, which is used to make steel for buildings, bridges, and cars. An ore is a rock or soil that a valuable mineral can be extracted from.

Pyrite (4) is also called "Fool's Gold" because it looks similar to real gold. The streak test is key to identifying it – real gold will leave a yellow streak while pyrite leaves a dark brown streak.

(5) is Milky Quartz. Quartz is the most common mineral on Earth. Quartz sand is melted to make glass. Milky quartz is one variety, but quartz comes in a lot of different colors and forms like amethyst, rose quartz, and agate.

Calcite (6) is one of the few minerals that is common in Florida. It's the main mineral in limestone, marble, seashells, and coral reefs. It's also an ingredient in cement and chalk.

Muscovite (7) is a type of mica. You can see that it is found in thin, transparent layers. Crushed muscovite is added to makeup to give it shimmer.

Magnetite (8) is one of the few naturally magnetic minerals. Ancient sailors used pieces of magnetite, called lodestones, in the first compasses to help navigate across oceans. It is also an important source of iron.

Talc (10) is the softest mineral on Earth. It's easily ground up very fine and was used in baby powder until we learned that breathing powdered talc is bad for your lungs, so now baby powders are made of cornstarch.

Biotite (12) is another mineral in the mica group. It contains unstable atoms that break down at an extremely predictable rate, which helps geologists calculate the age and history of rocks.

Graphite (13) is the "lead" we use in pencils. Since it's very soft, it transfers easily onto paper. Graphite is made of pure carbon, the exact same element that makes up a diamond, but the atoms of graphite and diamond are arranged in different crystal forms which gives them different properties.

Selenite (15) is a clear variety of gypsum. Gypsum is quite soft and is ground up to make drywall, which is the stuff the walls most of our homes are made of.